New Boraginales from Tropical America 5: New Names and Typifications for Neotropical Species of *Cordia* and *Varronia*

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Abstract. Typifications and new combinations are provided for Boraginaceae from the Mesoamerica region in advance of the treatment for *Flora Mesoamericana*. In addition, the recognition of the genus *Varronia* P. Browne as separate from *Cordia* L. requires new names for various species to be treated in several floristic projects. *Cordia skutchii* I. M. Johnston is lectotypified, *V. tarodaea* J. S. Miller is a new name presented for *C. longifolia* A. DC., and the following new combinations are made: *V. andreana* (J. Estrada) J. S. Miller, *V. buddleoides* (Rusby) J. S. Miller, *V. bullulata* (Killip ex J. Estrada & García-Barriga) J. S. Miller, *V. dardani* (Taroda) J. S. Miller, *V. eggersii* (K. Krause) J. S. Miller, *V. guanacastensis* (Standley) J. S. Miller, *V. guaranitica* (Chodat & Hassler) J. S. Miller, *V. harleyi* (Taroda) J. S. Miller, *V. intonsa* (I. M. Johnston) J. S. Miller, *V. lauta* (I. M. Johnston) J. S. Miller, *V. leucocephala* (Moricand) J. S. Miller, *V. leucomalloides* (Taroda) J. S. Miller, *V. linnaei* (Stearn) J. S. Miller, *V. macrodonta* (Killip) J. S. Miller, *V. roraimae* (I. M. Johnston) J. S. Miller, *V. sangrinaria* (Gaviria) J. S. Miller, *V. setigera* (I. M. Johnston) J. S. Miller, *V. stenostachya* (Killip ex Gaviria) J. S. Miller, *V. steyermarkii* (Gaviria) J. S. Miller, and *V. urticifolia* (Chamisso) J. S. Miller.

Key words: Boraginaceae, *Cordia*, Cordiaceae, Neotropics, *Varronia*.

Boraginaceae have traditionally been treated as comprising four subfamilies, Cordioideae, Ehretioideae, Heliotropioideae, and Boraginoideae, but recent molecular data indicate Hydrophyllaceae and Lennoaceae are both nested within the family as traditionally defined (Gottschling et al., 2005). Recent authors have recognized a more broadly defined Boraginales, with the four traditional subfamilies treated at the familial level (Cordiaceae, Ehretiaceae, Heliotropiaceae, and Boraginaceae), plus Hydrophyllaceae and Lennoaceae. Recent efforts to examine generic limits within Cordiaceae (Gottschling et al., 2005; Gottschling & Miller, 2006; Miller & Gottschling, 2007) have been completed prior to the preparation of a number of floristic projects in the Neotropics. In anticipation of those efforts, the nomenclature of species traditionally included in *Cordia* L. has been reviewed, and several species require typification or new combinations. These are presented below prior to submission of treatments for various floristic projects.

Cordia skutchii I. M. Johnston, J. Arnold Arbor. 21: 339. 1940. TYPE: Guatemala. Quezaltenango: Palamar, 1140 m, 12 Oct. 1934, *A. F. Skutch 1426* (lectotype, designated here, GH).

In naming this species, Johnston (1940) listed two of Skutch's collections (1425 and 1426) as types. *Skutch 1425* is a collection of a male plant, but *Skutch 1426* has both female flowers and fruits, so it is chosen here as a lectotype.

New Combinations in *Varronia* P. Browne

Most modern authors have followed Ivan Johnston (summarized in Miller, 2001a) in treating *Cordia* in a broad sense, but recent molecular studies (Gottschling et al., 2005) clearly show that the ca. 100 Neotropical species of multi-stemmed shrubs with serrate leaves and condensed inflorescences, which have been recognized as section *Varronia*, are sister to the rest of the genus and best recognized as a separate genus. Most of the required combinations exist, either through the work of early authors when opinions on generic delimitation varied widely, or from the recent nomenclatural review of Borhidi et al. (1988). However, the choice of appropriate names for some species has not been clarified, and in some cases new combinations are required. These clarifications and new combinations are provided below.

1. **Varronia andreana** (J. Estrada) J. S. Miller, comb. nov. Basionym: *Cordia andreana* J. Estrada, Fl. Colombia 14: 76. 1995. TYPE: Colombia. Magdalena: Cerro Palangana, E of Molino, 900 m, s.d., *O. Haught 4041* (holotype, COL; isotype, US).

Varronia andreana is a recently described species that is known only from the Colombian departments of Boyacá and Magdalena and is most closely related to

V. caput-medusae (Taubert) Friesen, with which it shares the presence of glandular hairs but differs in having inflorescences less than 2 cm long, as opposed to ca. 8 cm in the latter.

2. Varronia buddleoides (Rusby) J. S. Miller, comb. nov. Basionym: *Cordia buddleoides* Rusby, Mem. Torrey Bot. Club 6: 83. 1896. TYPE: Bolivia. La Paz: Mapiri, 1872, *M. Bang 1530* (holotype, NY; isotype, K).

This is a morphologically variable species that ranges from northern Brazil to Peru and Bolivia and is most closely related to *Varronia mollissima* (Killip) Borhidi and *V. guazumaefolia* Desvaux, but it can be separated from them by its calyx lobes that end in prolonged filiform tips and upper leaf surface that is glabrous or nearly so. However, there are morphological intermediates, and the complex needs further study.

3. Varronia bullulata (Killip ex J. Estrada & García-Barriga) J. S. Miller, comb. nov. Basionym: *Cordia bullulata* Killip ex J. Estrada & García-Barriga, Fl. Colombia 14: 70. 1995. TYPE: Colombia. s. loc., s.d., *J. C. Mutis 1956* (holotype, MA-MUT; isotypes, MA, US).

This species from Cundinamarca and Boyacá, Colombia, is closely related to *Varronia bullata* L. and *V. subtruncata* (Rusby) Friesen, but it differs in its red-brown pubescence and in having the inner surface of its calyx puberulent.

4. Varronia dardani (Taroda) J. S. Miller, comb. nov. Basionym: *Cordia dardani* Taroda, Notes Roy. Bot. Gard. Edinburgh 44: 111. 1986. TYPE: Brazil. Pernambuco: entre Carnaubeira-Belém de São Francisco, 17 May 1971, *E. P. Heringer et al. 862* (holotype, UB).

Known only from Pernambuco, Brazil, this species differs from others with terminal spicate inflorescences in its triangular-ovate leaves and lax inflorescences.

5. Varronia eggersii (K. Krause) J. S. Miller, comb. nov. Basionym: *Cordia eggersii* K. Krause, Bot. Jahrb. Syst. 37: 628. 1906. TYPE: Ecuador. "Prope Balao," 22 Feb. 1892, *H. F. A. von Eggers 14472* (holotype, B not seen, B photo at F).

This species from lowland western Ecuador is questionably distinct from other South American species with axillary spicate inflorescences with the peduncle adnate to the petiole, but further study will be necessary to resolve species limits.

6. Varronia guanacastensis (Standley) J. S. Miller, comb. nov. Basionym: *Cordia guanacastensis* Standley, Field Mus. Nat. Hist., Bot. Ser. 18: 982. 1938. TYPE: Costa Rica. Guanacaste: Bagaces, 29 June 1930, *A. M. Brenes 12713* (holotype, F 855662; isotypes, CR, NY).

This species occurs from Guerrero, Mexico, to Costa Rica. Borhidi et al. (1988) published the combination *Varronia coyucana* (I. M. Johnston) Borhidi, but the two names have been considered synonymous (e.g., Miller, 2001b) and the combination for the earlier name is necessary.

7. Varronia guaranitica (Chodat & Hassler) J. S. Miller, comb. nov. Basionym: *Cordia guaranitica* Chodat & Hassler, Bull. Herb. Boissier, ser. 2, 5: 305. 1905. TYPE: Paraguay. Cordillera de Altos, Oct. 1897, *E. Hassler 3381* (holotype, G-BOIS; isotypes, B, BM, G).

This easily recognized species occurs from northern Argentina into Paraguay and Bolivia and is distinctive in its low growth habit, narrowly oblanceolate leaves without evident secondary veins, terminal capitate inflorescences, and calyx teeth that lack filiform appendages.

8. Varronia harleyi (Taroda) J. S. Miller, comb. nov. Basionym: *Cordia harleyi* Taroda, Notes Roy. Bot. Gard. Edinburgh 44: 128. 1986. TYPE: Brazil. Bahia: Morro de Chapéu, ca. 8 km SW of the town of Morro do Chapéu, W of the rd. to Utinga, 3 Mar. 1977, *R. M. Harley, S. J. Mayo, R. M. Storr, T. S. Santos & R. S. Pinheiro 19312* (holotype, CEPEC; isotypes, E, K, MO).

This is a distinctive endemic of Bahia, Brazil, with ovate, crenate leaves, inflorescences with peduncles 2.3–7 cm long, and calyx lobes that lack filiform apices.

9. Varronia intonsa (I. M. Johnston) J. S. Miller, comb. nov. Basionym: *Cordia intonsa* I. M. Johnston, Contr. Gray Herb. 92: 28. 1930. TYPE: Brazil. Minas Gerais: betw. Salgado and Vao do Paranan, Sep. 1818, *C. F. P. von Martius s.n.* (holotype, B).

This species is perhaps only a hirsute form from Minas Gerais, Brazil, of *Varronia curassavica* Jacquin, but the species of *Varronia* with spicate inflorescences are taxonomically difficult and are in terrible need of a comprehensive review.

10. Varronia lauta (I. M. Johnston) J. S. Miller, comb. nov. Basionym: *Cordia lauta* I. M. Johnston, J. Arnold Arbor. 37: 288. 1956. TYPE: Mexico. Jalisco: Plan de Barrancas, 2500–3500 ft., 17 July 1951, *H. S. Gentry & C. L. Gilly 10878* (holotype, A; isotypes, MEXU, MICH).

In describing this species, Johnston (1956) noted its unusually large pollen and generally distinct morphology, including the largest corolla (6–8.2 cm long) in the genus. It is still known only from a few collections from Jalisco and Nayarit (*Miller & Tellez 6312*, MO).

11. Varronia leucocephala (Moricand) J. S. Miller, comb. nov. Basionym: *Cordia leucocephala* Moricand, Pl. Nouv. Amer. 148. 1846. *Lithocardium leucocephalum* (Fresenius) Kuntze, Revis. Gen. Pl. 2: 977. 1891. TYPE: Brazil. Bahia: Pouco d'Areia near Jacobina, *J. S. Blanchet 3880* (holotype, G; isotype, BM).

Varronia leucocephala is one of a large number of species with small terminal capitate inflorescences with calyx teeth that lack filiform projections. It can be recognized from the other species by its 2.5–3.5 cm long corolla, minutely serrulate leaf margin, and white tomentose calyx.

12. Varronia leucomalloides (Taroda) J. S. Miller, comb. nov. Basionym: *Cordia leucomalloides* Taroda, Notes Roy. Bot. Gard. Edinburgh 44: 125. 1986. TYPE: Brazil. Bahia: 6 km from Filadélfia on rd. BA 385 to Itúba, 18 Feb. 1974, *R. M. Harley 16143* (holotype, CEPEC; isotypes, E, K).

This species, known only from Paraíba in northeastern Brazil, is presumably closely related to *Varronia leucomalla* (Taubert) Borhidi, both of which share a distinctive white tomentose lower leaf surface. *Varronia leucomalloides* differs in having leaves less than 4 cm long, as opposed to *V. leucomalla*, which has much larger leaves greater than 8 cm and is known only from Rio de Janeiro.

13. Varronia linnaei (Stearn) J. S. Miller, comb. nov. Basionym: *Cordia linnaei* Stearn, J. Arnold Arbor. 52: 627. 1971. Type: Jamaica. St. Andrews: pastures behind Hope Gardens, 600–700 ft., 22 Oct. 1956, *G. Proctor 15789* (holotype, BM; isotype, IJ).

This species, which occurs from southern Mexico to Colombia and is also found in Jamaica, has a particularly contorted nomenclatural history (reviewed in Stearn, 1971). It occurs sympatrically throughout much of its range with *Varronia inermis* (Miller) Borhidi, but it differs in having consistently axillary small capitate inflorescences.

14. Varronia macrodonta (Killip) J. S. Miller, comb. nov. Basionym: *Cordia macrodonta* Killip, J. Washington Acad. Sci. 17: 328. 1927. TYPE: Peru. Piura: San Antonio, 1200 m, Mar. 1912, *A. Weberbauer 6015* (holotype, F; isotype, US).

This Peruvian endemic is distinct in its small cymose inflorescences and distinctly serrate leaves with subulate teeth.

15. Varronia roraimae (I. M. Johnston) J. S. Miller, comb. nov. Basionym: *Cordia roraimae* I. M. Johnston, Fieldiana, Bot. 28: 511. 1953. TYPE: Venezuela. Bolivar: SW forested slopes betw. Rondon Camp and base of sandstone bluffs, Mt. Roraima, 2040–2255 m, 30 Sep. 1944, *J. A. Steyermark 59003* (holotype, F; isotypes, GH, VEN).

This species is apparently restricted to tepuis in southern Venezuela (Johnston, 1953). It appears closely related to *Varronia spinescens* (L.) Borhidi and is similar in general appearance, but it differs in having narrow lanceolate leaves and inflorescences less than 2 cm long, but 5–7 mm thick, which is less than half the typical length and twice the normal thickness of *V. spinescens*.

16. Varronia sangrinaria (Gaviria) J. S. Miller, comb. nov. Basionym: *Cordia sangrinaria* Gaviria, Mitt. Bot. Staatssamml. München 23: 222. 1987. TYPE: Venezuela. Barinas: 10 km from Barinitas along rd. to Apartaderos, 800 m, 10 Oct. 1964, *F. Breteler 4258* (holotype, MER; isotypes, F, G, M, MO, NY, U).

This is a distinctive species that is apparently endemic to western Venezuela and is easily recognized by having leaves with evident tertiary venation, sharp apiculate leaf serrations, an even, brown indumenta on all parts, capitate inflorescences, and calyx lobes with prolonged filiform apices.

17. Varronia setigera (I. M. Johnston) J. S. Miller, comb. nov. Basionym: *Cordia setigera* I. M. Johnston, J. Arnold Arbor. 16: 176. 1935. TYPE: Brazil. Minas Gerais: near Fazenda Bom Jardim, Rio Jequitinhonha, 1817, *A. F. C. P. de St. Hilaire 1478* (holotype, P).

Apparently endemic in Minas Gerais, this species has only rarely been collected, and its relationships are not evident. However, it is distinctive and can easily be recognized by its capitate inflorescences, filiform calyx teeth, and 5–18 mm long corollas.

18. Varronia stenostachya (Killip ex Gaviria) J. S. Miller, comb. nov. Basionym: *Cordia stenostachya* Killip ex Gaviria, Mitt. Bot. Staatssamml. München 23: 243. 1987. TYPE: Venezuela. "Prope Maypures ad flumen Orinoco," June 1854, *R. Spruce 3642* (holotype, K; isotypes, K, W).

Varronia stenostachya is one of the more distinctive species of the group within *Varronia* characterized by spicate inflorescences and is easily recognized by its ovate leaves and its mixture of axillary and terminal, spicate inflorescences, which are free from the petioles.

This species is endemic to granitic outcrops, or lajas, that surround Puerto Ayacucho in southern Venezuela.

19. Varronia steyermarkii (Gaviria) J. S. Miller, comb. nov. Basionym: *Cordia steyermarkii* Gaviria, Mitt. Bot. Staatssamml. München 23: 200. 1987. TYPE: Venezuela. Lara: Sanare, 1358 m, May 1930, *J. Saer D'Heguert 480* (holotype, M; isotypes, F, VEN).

Varronia steyermarkii is known from several disjunct populations in Venezuela (Gaviria, 1987); it is distinctive and easily recognized by its narrow lanceolate leaves that are sessile or nearly so, capitate inflorescences, and calyx teeth that lack filiform projections.

20. Varronia tarodaea J. S. Miller, nom. nov. Basionym: *Cordia longifolia* A. DC., Prodr. 9: 495. 1845. TYPE: Brazil. Bahia: 1834, *J. S. Blanchet 1739* (holotype, G-DC; isotypes, BM, G, K).

There are only two known species of *Varronia* that have entire leaf margins and brochidodromous venation (the other being *V. poliophylla* (Fresenius) Borhidi). Both species are endemic to Bahia, Brazil, and may be separated by *V. tarodaea* being entirely glabrous, while *V. poliophylla* is pubescent on stems, calyces, and both leaf surfaces. Sessé and Moçiño's (1893) name *V. longifolia* blocks the transfer of the epithet long associated with this species in the genus *Cordia*, so the new name honors Neusa Taroda, who did so much fine work on the species of *Varronia* in Brazil.

21. Varronia urticifolia (Chamisso) J. S. Miller, comb. nov. Basionym: *Cordia urticifolia* Chamisso, Linnaea 4: 483. 1829. TYPE: Brazil. "Brasilia tropica," s.d., *F. Sellow s.n.* (holotype, G not seen, G photo at MO).

This species appears to be closely related to *Varronia polycephala* Lamarck and other species of *Varronia* with branched inflorescences. Taroda and Gibbs (1986) recognized it as distinct based on its axillary panicles on robust peduncles and densely hirsute stems. It is restricted to southern Brazil and Paraguay.

Literature Cited

Borhidi, A., E. Gondár & Z. S. Orosz-Kovács. 1988. The reconsideration of the genus *Cordia* L. Acta Bot. Hung. 34: 375–423.

Gaviria, J. 1987. Die gattung *Cordia* in Venezuela. Mitt. Bot. Staatssamml. München 23: 1–279.

Gibson, D. N. 1970. Boraginaceae. *In* Flora of Guatemala. Fieldiana, Bot. 24(9): 111–167.

Gottschling, M. & J. S. Miller. 2006. Clarification of the taxonomic position of *Auxemma*, *Patagonula*, and *Saccellium* (Cordiaceae, Boraginales). Syst. Bot. 31(2): 361–367.

———, ———, M. Weigend & H. H. Hilger. 2005. Congruence of a phylogeny of Cordiaceae (Boraginales) inferred from ITS1 sequence data with morphology, ecology, and biogeography. Ann. Missouri Bot. Gard. 92: 425–437.

Johnston, I. M. 1940. Studies in the Boraginaceae XV. Notes on some Mexican and Central American species of *Cordia*. J. Arnold Arbor. 21: 336–355.

———. 1953. Boraginaceae. *In* J. A. Steyermark (editor), Contribution to the flora of Venezuela. Fieldiana, Bot. 28: 511–512.

———. 1956. Studies in the Boraginaceae XXVIII. New or otherwise interesting species from America and Asia. J. Arnold Arbor. 37: 288–306.

Miller, J. S. 2001a. Two new species of *Cordia* L. (Boraginaceae) from Madagascar. Adansonia, sér. 3, 23: 289–295.

———. 2001b. Boraginaceae. *In* W. D. Stevens, C. Ulloa U., A. Pool & O. M. Montiel (editors), Flora de Nicaragua. Monogr. Syst. Bot. Missouri Bot Gard. 85: 435–455.

——— & M. Gottschling. 2007. Generic classification in the Cordiaceae (Boraginales): Resurrection of the genus *Varronia* P. Br. (Cordiaceae). Taxon 56(1): 163–169.

Nowicke, J. W. & J. S. Miller. 1990. Pollen morphology of the Cordioideae (Boraginaceae): *Auxemma*, *Cordia*, and *Patagonula*. Pl. Syst. Evol., (Suppl. 5): 103–121.

Sessé, M. & J. M. Moçiño. 1893. Flora Mexicana, Part 4. Madrid.

Stearn, W. T. 1971. Taxonomic and nomenclatural notes on Jamaican gamopetalous plants. J. Arnold Arbor. 52: 614–648.

Taroda, N. & P. E. Gibbs. 1986. A revision of the Brazilian species of *Cordia* subgenus *Varronia* (Boraginaceae). Notes Roy. Bot. Gard. Edinburgh 44: 105–140.